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(11) EP 0 894 923 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.02.1999 Bulletin 1999/05

(51) Int. Cl.⁶: E05B 65/20, E05B 9/08

(21) Application number: 98114295.3

(22) Date of filing: 30.07.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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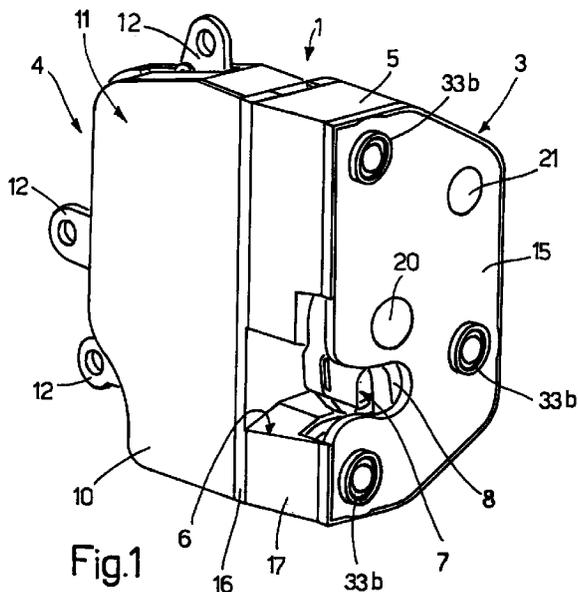
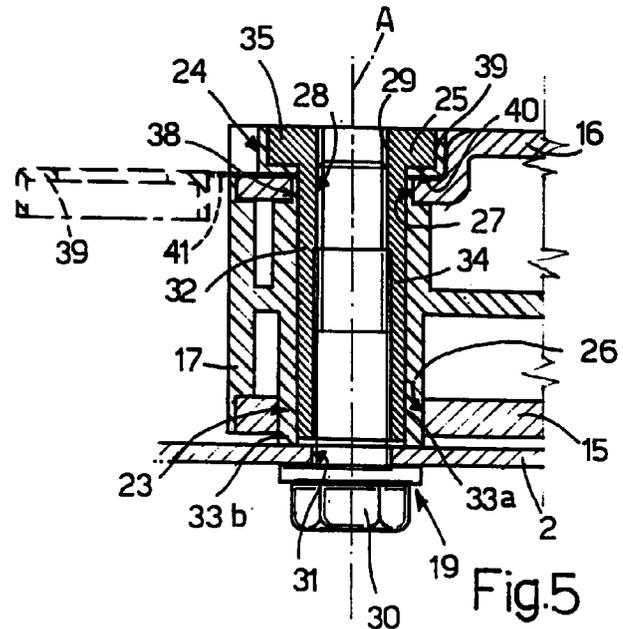
(30) Priority: 31.07.1997 IT TO970691

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(54) Lock for a motor vehicle door

(57) Lock (1) for a motor vehicle door (2) comprising an external body (11) having at least one metal plate (15) able to be secured to the door (2), a closure mechanism (7) carried by the plate (15) and having a fork (8) moving between two operational positions, respectively for opening and closure of the lock (1), and a stop (9) able to lock in a releasable manner the fork (8) itself in the closure operational position, an actuation mechanism (12) for the closure mechanism (7), and support means (17) made of relatively yielding material and able to be interposed, in service, between the plate (15) and the door (2) to prevent a direct metal on metal contact.



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Description

[0001] This invention concerns a striker for a motor vehicle door lock.

[0002] It is emphasized that the term "door" is used in this description and in the claims in its very widest sense, to indicate whatsoever moving component between an opening position and a closing position of an access aperture to an internal compartment of a vehicle. The above terms consequently comprise in addition to the side doors of the motor vehicle, which will be referred to in the following without the loss of any general sense, also the hoods or front and rear doors or hatches.

[0003] Locks are known for motor vehicle doors essentially comprising a support body which defines an aperture communicating with the outside through a frontal aperture and provided with a metal plate able to be connected by means of screws with the motor door vehicle door, or more seldom with an upright of the door itself, a closure mechanism housed within the aperture of the support body and an actuation mechanism for the closure mechanism.

[0004] In particular the closure mechanism comprises a fork hinged about a first fixed pin carried by the plate and arranged to cooperate with a striker integral with an upright of the door, or more seldom secured to the door itself, and a stop hinged about a second fixed pin carried by the plate and able to lock in a releasable manner the fork in a closure operational position on the striker itself.

[0005] The known locks have the following disadvantages.

[0006] In particular, as the connection between the lock metal plate and of the sheet metal of the motor vehicle door, or of the upright of the door itself, involves a direct metal contact, the typical lock noises, mainly due to impacts between the striker and the fork and between the latter and the stop during the door closure and phases, are propagated through the bodywork, which acts as a sounding box, and are noticeable with some discomfort both outside and inside the motor vehicle body cell.

[0007] In addition, the inevitable assembly clearances between each door of the motor vehicle and the relative upright generally determine a poor positioning of the lock in relation to the relative striker; in the closure mode the connection between the fork and the striker thus produces a slight elastic distortion of the door, which returns elastically to its original shape when the lock is opened, emitting an undesirable noise which is added to the aforesaid typical noises of the lock.

[0008] The purpose of the present invention is to achieve a lock for a motor vehicle door, which allows in a simple and economical manner the reduction of avoidable noise in the closure and the opening stages of the door of the motor vehicle itself.

[0009] The above scope is achieved by the present

invention, insofar as it is relative to a lock for a motor vehicle door comprising an external body having at least a first metal plate able to be secured to a portion of the bodywork of the said motor vehicle, a closure mechanism carried by the said first plate and having a fork moving between two operational positions featuring the opening and closure of the said lock respectively, and a stop able to lock in a releasable manner the fork itself in its operational closure position, and an actuation mechanism for the said closure mechanism, characterized by the fact that it comprises means of support made of relatively yielding material and able to interpose itself, in service, between the said first plate and the said bodywork portion to prevent direct metal on metal contact.

[0010] For a better understanding of the invention a preferred form of implementation is described hereinafter, as a purely non-restrictive example and with reference to the appended drawings, wherein:

- Fig. 1 is a perspective view of a lock of modular type constructed according to the present invention;
- Fig. 2 is a lateral view of a closure module of the lock in Fig. 1;
- Fig. 3 is a frontal view of the closure module in Fig. 1;
- Fig. 4 is a section along line IV-IV in Fig. 3;
- Fig. 5 is a section on an enlarged scale according to line V-V in Fig. 2; and
- Fig. 6 is a lateral view, on an enlarged scale of a component in Fig. 2.

[0011] With reference to Fig. 1 it is indicated under reference 1 of the assembly a lock for a door 2 (Fig. 5) of a motor vehicle (not illustrated).

[0012] The lock 1 is of modular type and comprises a closure module 3 able to cooperate with a fixed striker (of known type and not illustrated) integral with an upright (not illustrated) of the door 2, and an actuation module 4 connected with the closure module 3.

[0013] The closure module 3 comprises essentially a surrounding 5 able to be secured to the door 2 and having a frontal aperture 6 for the entry of a check-dowel (not illustrated) for the striker, and a closure mechanism 7 housed within the inside of the surrounding 5 and comprising in turn a fork 8 able to cooperate with the aforesaid striker, and a stop 9 able to lock in a releasable manner the fork 7 in a closure operational position on the lock itself.

[0014] The actuation module 4, not described in detail insofar as it does not form part of the present invention, comprises essentially a surrounding 10 connected with the surrounding 5 of the closure module 3 and defining therewith an external body 11 of the lock 1, and a plurality of levers 12 (only visible in minimal parts in Fig. 1) housed inside the surrounding 10 and operated from the outside to actuate the closure mechanism 3.

[0015] With reference to the Figs. 1 to 5, the surrounding 5 comprises two plates 15, 16 located facing each

other and parallel, and a bearing shell 17 interposed in a sandwich manner between plates 15, 16 themselves and internally defining an aperture 18 communicating with the outside through the opening 6 and in which is located the closure mechanism 7.

[0016] In particular, the plates 15, 16 are constructed of metal material, they are able to be connected to the door 2 by means of a plurality of securing means 19 also made of metal and having respective axes A located orthogonal in relation to the plates 15, 16 themselves, and supporting together the fork 8 and the stop 9.

[0017] More specifically, the plate 15 is located in service adjacent to the door 2, whereas the plate 16 is located on the opposing part of plate 15 in relation to the door 2 itself.

[0018] The fork 8 is fitted to rotate about a first fixed pin 20 integral with the plates 15, 16 and extending in orthogonal manner between the plates 15, 16 inside the aperture 18 of the shell 17, whereas the stop 9 is fitted to rotate on a second fixed pin 21 also integral with plates 15, 16 and extending in orthogonal manner between the plates 15, 16 inside the aperture 18.

[0019] The fork 8 has a U-shaped seat (22) arranged to engage the striker check dowel, and normally retained by a spring, of a known type and not illustrated, in an opening operational position, in which the seat 22 is essentially arranged to correspond with the aperture 6 of the surrounding 5 and is turned towards the outside; in addition, in order to cooperate with the striker, the fork 8 is movable from the opening operational position to the closure operational position, in which it engages with the striker check dowel, and is arranged with the seat 22 directed towards the inside of the aperture 18 (Figs. 1, 3 and 4).

[0020] According to the invention the shell 17 is made of relatively yielding material integrally comprising for each securing component 19, a first bearing component 23 interposed between the plate and the above securing means 19 and arranged to be interposed in service, between the plate 15 and the door 2, and a second bearing component 24 interposed between the plate 16 and the above securing component 19, to prevent direct metal on metal contacts. It is emphasized that the term "relatively yielding material" is used to indicate a relatively soft plastic material, for instance polyurethane resin, or an elastically yielding material for instance an elastomer material, and more generally, to indicate whatsoever material having a level of deformability considerably greater than that of the metal materials used for the door 2 and the plates 15, 16.

[0021] With reference to Figs. 4 to 6, each securing component 19 comprises a metal bush 25 along axis A engaging coaxially with relative passing holes 26, 27 through the plates 15, 16 by means of the interposition of the respective bearing components 23, 24, having a surface 28 which is internally radially threaded to match an end section 29 adjacent to plate 16, and able to

engage in service with a screw 30 inserted through a relative passing hole 31 in the door 2 and connecting the plates 15, 16 to the door 2 itself.

[0022] In particular each bush 25 is fitted in a relative seating 32 on axis A recessed in the shell 17 and defined to match the opposing axial ends of the respective bearing components 23, 24, which as previously stated define integral portions of the shell 17 itself.

[0023] Each bearing component 23 is of annular shape along axis A and comprises a first section 33a interposed between the relative bush 25 and a lateral surface of the relative hole 26 of plate 15 and a second section 33b which in service projects axially towards the door 2 in relation to the bush 25 itself and to the plate 15 and arranged to meet the end of the relative hole 31 in door 2.

[0024] Each bush 25 comprises a main part 34 engaging in the respective holes 26, 27 of the plates 15, 16 and an end head 35, essentially of oblong form, having a maximum length greater than the external diameter of the portion 34 and placed to bear against the plate 16 by interposing the relevant bearing component 24. More precisely, the head 35 of each bush 25 is defined by two flat surfaces 36 parallel to each other, essentially tangential to the external surface of portion 34, and by two curved surfaces 37 convex towards the outside, facing away from each other, extending between opposing ends of the surfaces 36 and defining in association with their own central positions the maximum length of the head 35 (Fig. 6).

[0025] Each bearing component 24 comprises a cylindrical annular portion 38 interposed between the portion 34 of the relative bush 25 and a lateral surface of the relative hole 27 of plate 16, and a recessed portion 39 housing the head 35 of the bush 25 and having a drilled bottom wall 40 engaging with the portion 34 of bush 25 and interposed between the head 35 and the plate 16.

[0026] The portions 39 are achieved by integral pressing of the shell 17 in the manufacturing position, in which they protrude externally from the shell 17 and are connected thereto by means of relative strips 41, which can be folded back from the manufacturing position into the service position, in which they house the heads 35 of the respective bushes 25.

[0027] This arrangement allows the avoidance of the presence of undercuts which would present problems during the pressing stages.

[0028] Following examination of the characteristics of the lock 1 built according to the present invention the advantages it allows to be obtained are evident.

[0029] Above all, it emerges from the previous description that the fork 8 and the stop 9 are supported exclusively by the plates 15, 16, whereas the shell 17 fulfils a containment function for the closure mechanism; the shell 17 can thus be advantageously manufactured from relatively yielding material, also allowing by means of the bearing components 23, 24 to achieve

the important function of preventing direct metal contacts between the plates 15, 16 and the door 2 and between the latter and the securing components 19. The lock 1 as an assembly is thus "isolated" from the door 2 thus allowing a considerable reduction in the propagation of noises from the lock 1 itself, as noted during the closure and opening phases, towards the outside and towards the inside of the motor vehicle cell.

[0030] In addition, the shell 17 made of relatively yielding materials allows following closure, slight displacements of lock 1 in relation to the relative striker in such a manner as to compensate for the inevitable assembly play between the door 2 and the respective upright and to greatly reduce the elastic distortion of the door (2) itself, and thereby the consequent emission of unwanted noises during the opening phase.

[0031] Finally it is clear that the lock 1 allows modifications and variations without going outside the protective scope of the present invention.

[0032] In particular, the surrounding 5 could comprise a single plate 15 integrally connected with the door 2 by a plurality of securing components 19; in that case the shell 17 should thus be replaced by components made of relatively yielding materials and allowing their interposition in service, between the plate 15 and the door 2 and between the latter and each of the securing components 19.

[0033] In addition, the lock 1 could be fitted to the upright of the door 2 and could cooperate with a striker which is integral with the said door.

Claims

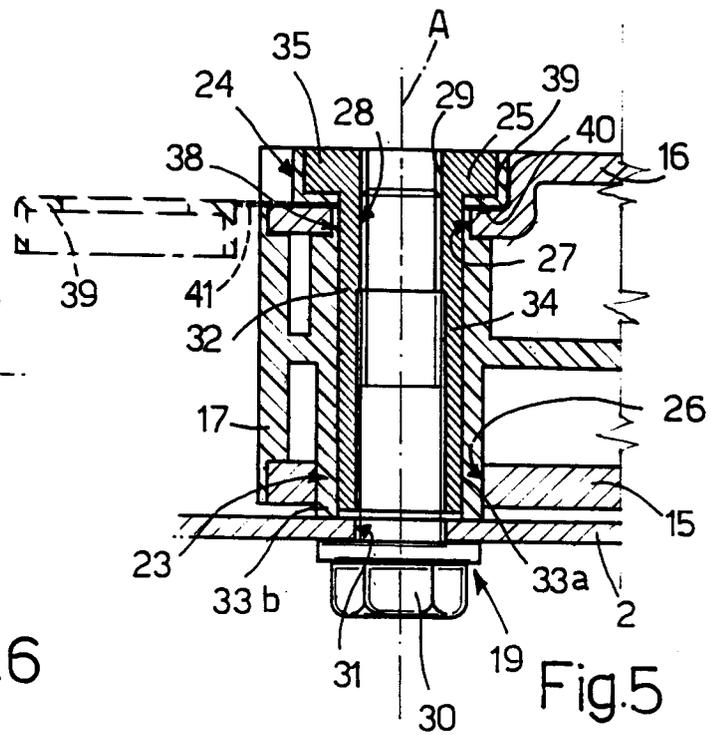
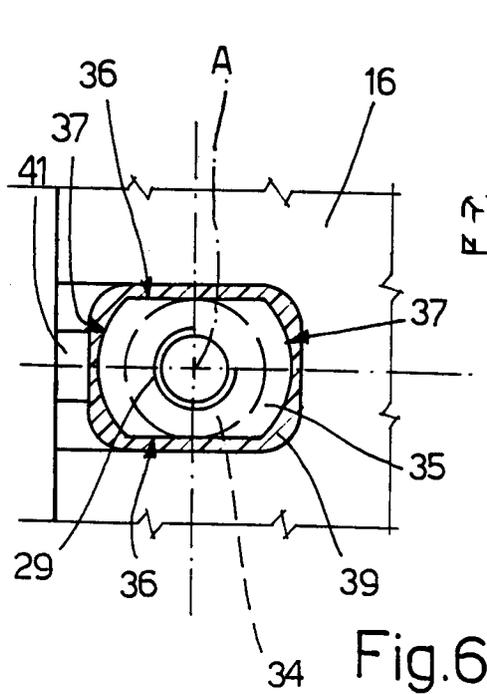
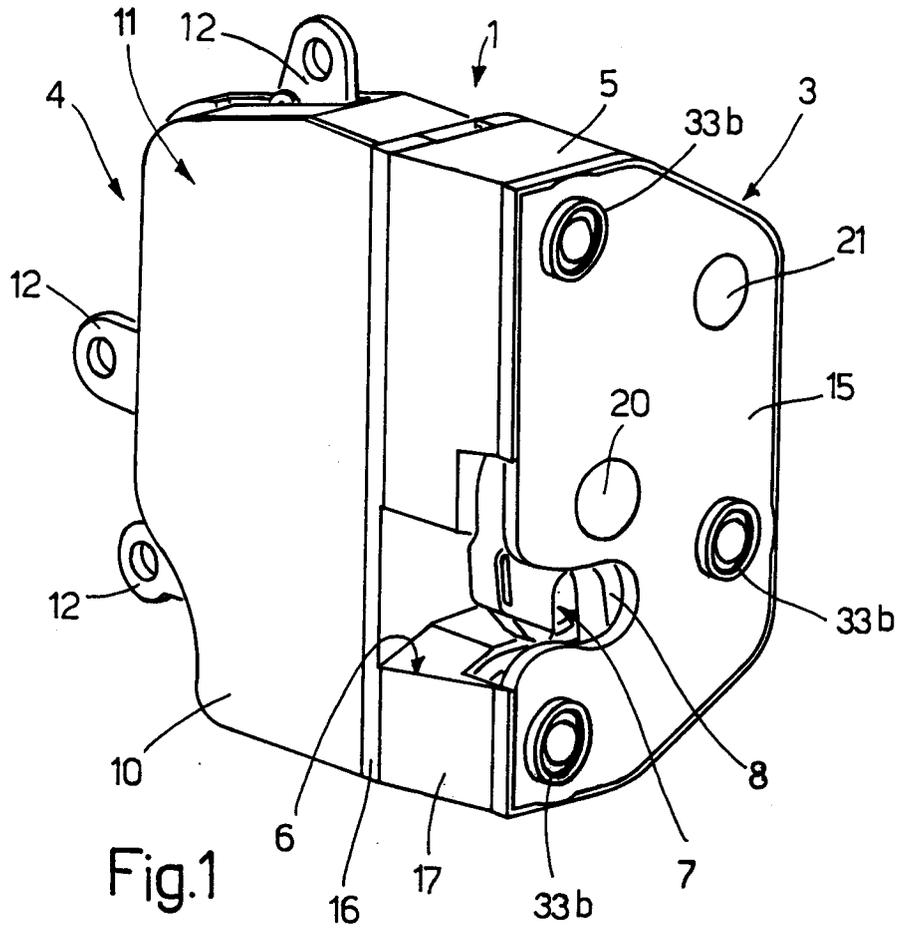
1. Lock (1) for a motor vehicle door (2) comprising an external body (11) having at least a first metal plate (15) arranged to be secured to a portion (2) of the bodywork of the said vehicle, a closure mechanism (7) carried by the said first plate (15) and having a fork (8) moving between two operational positions, respectively opening and closing the said lock (1), a stop (9) arranged to lock the fork (8) in a releasable manner in the said closure operational position, and an actuation mechanism (12) for the said closure mechanism (7), characterised by the fact that it comprises bearing means (17) made of relatively yielding material allowing in service, its interposition between the said first plate (15) and the said portion of the bodywork (2) to prevent a direct metal on metal contact.
2. Lock according to claim 1, characterised by the fact that it comprises a plurality of metal securing components (19) to connect the said first plate (15) with the said portion of the bodywork (2), and the fact that the said bearing means (17) comprise, for each of the said securing components (19), a first bearing component (23) interposed between the said first plate (15) and the said securing component (19).
3. Lock according to claim 2, characterised by the fact that each said securing component (19) comprises a metal bush (25) engaging a relative first passing hole in the first plate (15) by way of the interposition of the relative said first bearing component (23), having a radial internal surface (28) at least partly threaded, and arranged to be engaged in service by a connecting screw (30) for the first plate (15) to the said bodywork portion (2) each said first bearing component (23) being annular in form and comprising in service a stretch (33b) axially projecting towards the said bodywork portion (2) in respect to the said bush (25) and to the said first plate (15) and placed to bear against the said bodywork portion (2).
4. Lock according to claim 2 or 3, characterised by the fact that the said external body (11) comprises a second metal plate (16) placed to turn towards the said first plate (15) and secured to the said first plate (15 and the said bodywork portion (2) by way of the said securing means (19), the said securing means comprising for each said securing component (19), a second bearing component (24) interposed between the said second plate (16) and the securing component (19), the said external body (11) comprising in addition, a shell (17) in relatively yielding material interposed as a sandwich between the said first and second plate (15,16) housing the said closure mechanism (7) and defining the said bearing means, the said first and second bearing components (23,24) defining integral portions of the said shell (17).
5. Lock according to claim 4, characterised by the fact that each said bush (25) has a main portion (34) engaging a said relative first passing hole (26) of the said first plate (15) by way of interposition of a relative said first bearing component (23) and a relative second passing hole (27) in the said second plate (16) by way of interposition of a relative said second bearing component (24), and an end head (35) having a maximum dimension greater than the outer diameter of the main portion (34) and placed to bear against the said second plate (16) by way of the interposition of the said second bearing component (24).
6. Lock according to claim 5, characterised by the fact that each said second bearing component (24) comprises a cylindrical annular portion (38) interposed between the said main portion (34) of the said relative bush (25) and a lateral surface of the said relative second hole (27) in the said second plate (16), and a cup-like portion (39) housing the said end-head (35) of the said bush (25) and having a

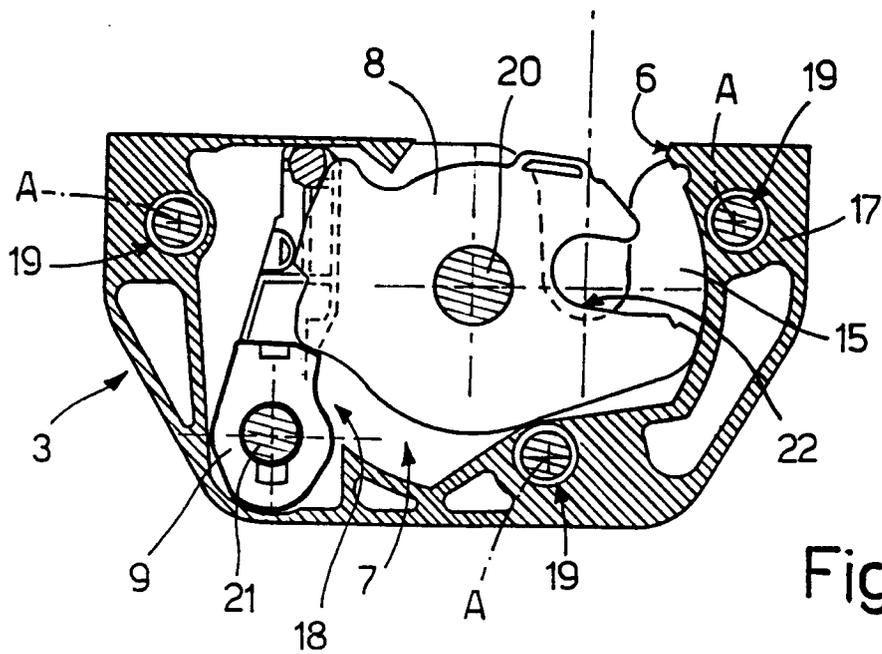
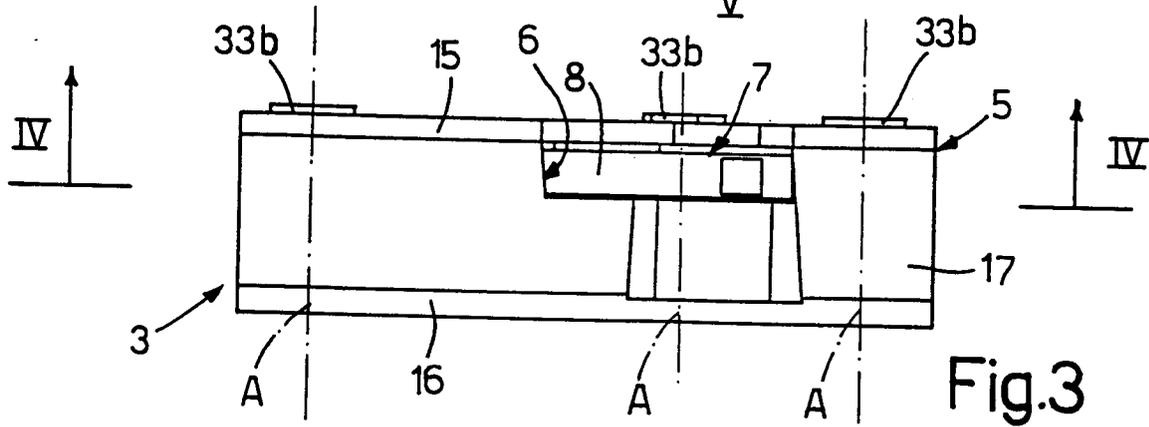
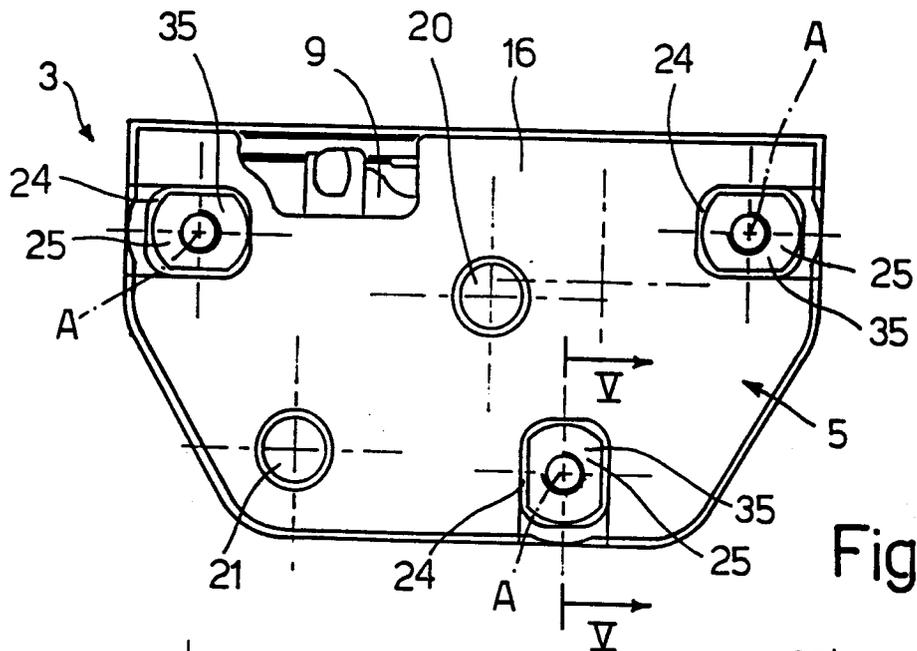
perforated bottom wall (40), engaged by the main portion (34) and interposed between the said end-head (35) and the said second plate (16).

7. Lock according to claim 6, characterised by the fact that the said cup-like portions (39) are achieved by integral pressing on the said shell (17) in a manufacturing position, in which they project externally from the shell (17) and are secured thereto by means of relative strips (41), and are arranged for folding back to correspond with the said strips (41) of the said manufacturing positions to a service position, in which are housed the respective said head-ends (35) of the said bushes (25).
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8. Lock according to any one of claims 4 to 7, characterised by the fact that it is of modular type and comprises a closure module (3) and an actuation module (4), the said closure module (3) comprising an external envelope (5) defined by the said first and second plate (15, 16) and the said shell (17) and housing the said closure mechanism (7).
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9. Lock according to any one of the precedent claims, characterised by the fact that the said bearing means (17) are produced in relatively soft plastic material.
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10. Lock according to claim 9, characterised by the fact that the said relatively soft plastic material is polyurethane resin.
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11. Lock according to any one of the claims from 1 to 8, characterised by the fact that the said bearing means (17) are produced in elastically yielding material.
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12. Lock according to claim 11, characterised by the fact that the said elastically yielding material is an elastomer material.
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13. Lock according to any one of the precedent claims, characterised by the fact that the said portion of the motor vehicle bodywork portion consists of that of the door (2).
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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 4295

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE 196 45 506 A (VOLKSWAGEN AG) 28 May 1997 * column 4, line 6 - line 42; figures 4,5 * ---	1	E05B65/20 E05B9/08
A	US 4 679 836 A (PUPILLO ET AL.) 14 July 1987 * column 4, line 30 - line 33; figures 1,4,7 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		18 November 1998	Westin, K
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